

# **NAVSEA**

## **POLLUTION PREVENTION**



## **DESKTOP GUIDE**

11 April 2000

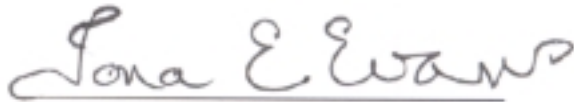
## **ENDORSEMENT**

As the Director of the NAVSEA Office of Environmental Protection, Occupational Safety Health, it gives me great pleasure to present the *NAVSEA Pollution Prevention Desktop Guide*. The NAVSEA P2 Desktop Guide Subcommittee of the NAVSEA Pollution Prevention Working Group worked diligently to develop this guide for your use. The guide is intended to assist acquisition and weapon system program managers and field activity personnel in implementing P2 in their program areas.

P2 is the strategy of choice to help program managers address issues such as:

- ♦ Reducing total ownership costs
- ♦ Maintaining or improving operational flexibility
- ♦ Improving quality of life
- ♦ Preserving the environment

I applaud your interest in P2 and believe this guide will help you improve your environment and reduce your total ownership costs.

A handwritten signature in dark ink, reading "Iona E. Evans", written in a cursive style.

IONA E. EVANS

Director

Office of Environmental Protection, Occupational  
Safety and Health

## **ACKNOWLEDGEMENTS**

NAVSEA 00T would like to thank the members of the NAVSEA P2 Working Group for supporting the development of the P2 Desktop Guide and to recognize the NAVSEA P2 Desktop Guide Subcommittee Members whose efforts were essential to the success of this project.

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# EXECUTIVE SUMMARY

The NAVSEA Pollution Prevention (P2) Desktop Guide is meant for use by NAVSEA acquisition and weapon system program managers and field activity personnel. The guide provides an overview of what P2 is and how it can be used to identify and eliminate harmful health effects and environmental hazards. The guide emphasizes the use of P2 to address problems at the source in order to make compliance easier. It identifies where P2 can be applied throughout the acquisition management process to:

- ♦ Reduce total ownership cost
- ♦ Decrease environmental, safety, and health (ESH) risks
- ♦ Promote proactive environmental compliance
- ♦ Meet the ESH requirements of DoD Regulation 5000.2R


The guide is a multifaceted tool that will provide acquisition program managers (for all acquisition category levels) with a working knowledge of P2. The guide accomplishes its mission through a user-friendly format, providing clear and simple examples. It uses success stories, case studies, graphical data collections, and links to other resources to illustrate definitions, program drivers, program basics, and program improvements for a beginning P2 program.

This is the first iteration of the guide. As a living document, it will be updated frequently based upon user feedback, program changes, and NAVSEA community needs. Keep checking for updates and improvements!

We look forward to receiving your comments and answering your questions. Please take the time to provide and forward your feedback using the [Feedback Form](#).

## USER GUIDE

The following desktop features are provided to ease and speed your navigation:

- ♦ **Table of Contents**: *Choose a section of interest by clicking on it and you will be taken there automatically.*
- ♦ **Key ideas/concepts**: *Accentuated with a golden key figure.* 
- ♦ **Underlined Terms**: *Definitions for underlined-italicized terms in green font are available in [Appendix A](#) and via pop-up text boxes when the cursor is moved over the item.*
- ♦ **LINKS**: *Indicates a link to further information. Activate by clicking. (Use your browser's BACK button to return to the Desktop Guide.)*

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# I. INTRODUCTION: P2 Provides Results

## 1.1 The VIRGINIA Class Submarine Program

**The Challenge:** The VIRGINIA Class (New Attack) Submarine Program, a major acquisition category (ACAT) program, was initiated in Fiscal Year 1991 to design a more affordable, nuclear-powered attack submarine. The Program's primary challenge was *"...meeting the military needs of the 21st century, integrating environmental and safety considerations into the program, and still meeting the ever-tightening budget..."*

**The Tool:** To meet this challenge, the Program turned to pollution prevention (P2). Program managers reasoned that designing P2 considerations into the weapon platform from the beginning would provide up-front as well as downstream savings, conserve resources, and allow them to meet their environmental and budgetary goals.

**The Results:** *A submarine designed and constructed so operation, deployment, maintenance, overhaul, and ultimate disposal will meet all applicable environmental concerns, while also saving money throughout its life-cycle and meeting its mission requirements!* The VIRGINIA Class Program set the standard for environmental excellence among DoD weapon system acquisition programs and has won:

- ♦ DoD P2 Award
- ♦ SECNAV P2 Award
- ♦ CNO P2 Award
- ♦ NAVSEA P2 Award
- ♦ EPA Stratospheric Ozone Protection Award



*The Navy's newest submarine will meet the challenges of the future while saving money & protecting the environment.*

## 1.2 How They Did It

The VIRGINIA Class Program applied an Integrated Product and Process Development approach from a total *life-cycle perspective* to analyze potential environmental consequences for the entire *life-cycle* of the submarine. The approach relied on input from joint government/contractor design/build teams composed of experts familiar with submarine systems and components, their material makeup, and the waste streams created by their manufacture, installation, testing, operation, maintenance, and ultimate disposal. The Program relied on the work of these teams to incorporate P2 considerations into the design of the submarine in order to save money and protect the environment. The general approach was to:

- ♦ Instill P2 into management processes, which translated into P2 decisions
- ♦ Invest in up-front actions to reduce or avoid future environmental costs

Specific P2 initiatives employed by the VIRGINIA Class Program included:

- ♦ Development of a "Solvents and Cleaners Selection Guide," which lists 15 environmentally preferred products and the recommended applications for each. This guide assists in selecting the correct solvent or cleaner for all construction applications.
- ♦ Development of a list of 70 priority *hazardous materials* (HMs) targeted for elimination/reduction and control. Identification of any of these priority materials in any

life-cycle process initiated efforts to identify alternative materials and processes as substitutes.

- ◆ Development of system-level design/build environmental analyses (DBEAs). The DBEA process comprises the system-level analysis of almost 300 major components and systems to identify the potential for adverse environmental impacts and to allow incorporation of preventive or mitigation measures in the design/build process.
- ◆ Implementation of a vendor environmental study to help vendors identify P2 opportunities at the source, before the products were delivered for incorporation into VIRGINIA Class systems.
- ◆ Incorporation of environmental awareness training to provide the basic knowledge needed to recognize actions and materials that have potential negative environmental impacts.
- ◆ Development of environmental focus groups to investigate specific areas for incorporation of P2 opportunities. Focus groups were created for hazardous materials prioritization, alternative materials/cleaner processes, supply support, operational waste streams, design for disposal, design yard environmental compliance, and homeporting.
- ◆ Standardizing consumable groups widely used in construction and maintenance to reduce the total amount used. The consumable groups that were standardized include solvents; adhesives, fillers, and sealants; paints; refrigerants; oils, lubricants, and hydraulic fluids; and welding and allied processes.

## II. OVERVIEW: What P2 Is All About

### 2.1 What Is P2?



*Pollution Prevention (P2) is about reducing or eliminating pollution, rather than trying to control it.*

The basics of P2 have been around for a while as part of Total Quality Management and other business management philosophies. Many private and public sector organizations have already implemented P2 programs to achieve more strategic environmental management.

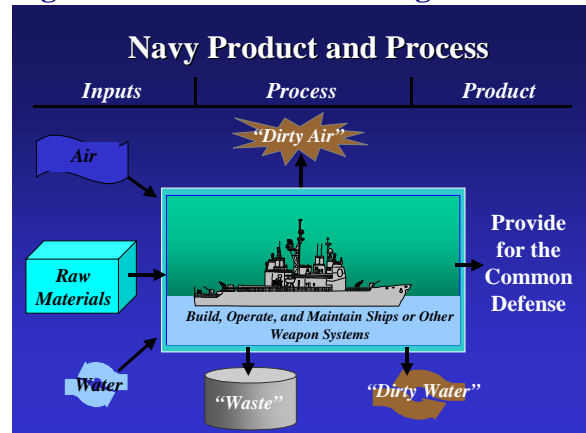
Simply put, P2 is about identifying and eliminating potentially harmful health effects and environmental hazards. P2, at its best, eliminates pollution at the source. Thus, it should be the method of choice to address compliance requirements.

P2 is a life-cycle process. It must be integrated into an activity's or organization's thinking and practices, "programmed into" the life of all ships and weapon systems — from acquisition and development, through in-service use, to decommissioning. This proactive approach to environmental protection contrasts sharply with the more familiar, mostly reactive, "end-of-pipe" pollution control approach.



*Generating pollution is not a necessary part of doing business, and avoiding it altogether almost always saves money!*

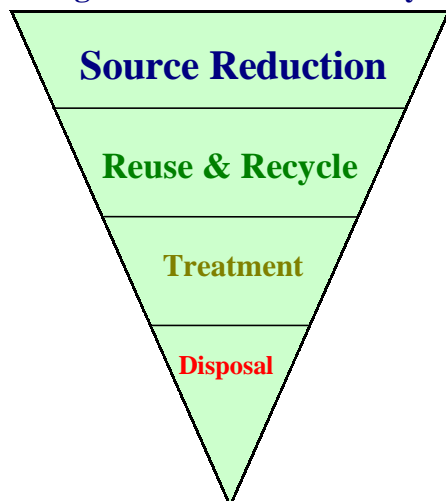
**Figure 1. P2 Is About Limiting Pollution**



### 2.2 P2 Hierarchy

The EPA P2 hierarchy, which the Navy has adopted, has the following levels:

**Figure 2. The P2 Hierarchy**



- ◆ **Source Reduction:** Prevent pollution at the source to eliminate or minimize adverse health effects while protecting, preserving, restoring, and enhancing the quality of the environment.
- ◆ **Reuse/Recycle:** Reuse pollutants that cannot be eliminated. Recycle, in an environmentally safe manner, pollutants that cannot be reused.
- ◆ **Treatment:** Treat, in an environmentally safe manner, pollutants that cannot be eliminated or recycled.
- ◆ **Disposal:** Dispose or release pollutants into the environment only as a last resort, and only where disposal or release can be controlled and conducted in a manner safe for human health and the environment, and is consistent with applicable legal requirements.



## 2.3 Why P2?

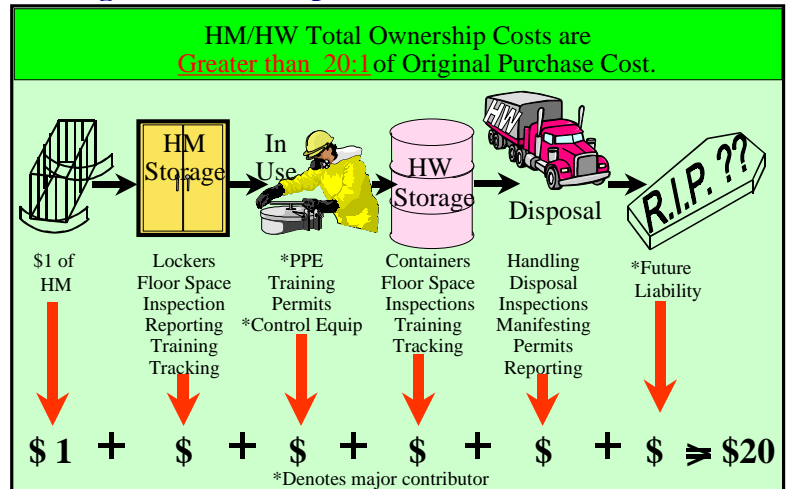
Why all the fuss? Pollution increases human health risks and harms the environment upon which we all depend. The typical “end-of-pipe” approach to dealing with pollution does little to prevent pollution or avert future impacts – often, it just causes pollution to be shifted from one environmental medium (air, water, land) to another.

### 2.3.1 P2 Is Smart Business

In this era of tight budgets and limited resources, P2 is *smart business*. For example, hazardous material is expensive to use — it’s expensive to buy, store, manage, and dispose of. Current estimates put the total life-cycle cost of hazardous material at 20:1.

*That means, on average, it costs \$20 to handle hazardous material over its entire life-cycle for every \$1 of material bought! We should be asking: “Why buy HM in the first place?”*

**Figure 3. HM: Expensive From Cradle to Grave**



**NOTE:** The 20:1 ratio is a conservative estimate based on various HM cost studies (some studies have affirmed ratios of as much as 80:1). Data from 1998 Human Systems Center (Brooks Air Force Base) DoD-wide study performed at the request of Environmental Security.

*By implementing P2 source reduction practices at your activity or organization, you can reduce your resource expenditures.*

For further information on waste management and disposal costs refer to: **Navy Surface Ship Waste Management and Disposal Costs, Projected 1995-2020**, prepared by the Naval Sea Systems Command (NAVSEA) Surface Ship Waste Management Program. (Carl Adema, SEA 05R24, (703) 602-0706).

### 2.3.2 P2 Can Also Make Life Easier

In addition to the cost involved in using hazardous materials, there are other issues to consider. *For example, if hazardous materials and/or hazardous waste streams can be eliminated or reduced, regulatory and liability concerns are reduced or even eliminated!*

#### Example: Save Money & Make Your Life Easier

The conventional approach for reducing air emissions from painting has been to change from high-pressure air guns to high-volume, low-pressure air spray guns. However, using the P2 approach, you are encouraged to find a solution that **ELIMINATES** the toxic waste stream. For example, many commands (afloat and ashore) replaced conventional air spray painting with powder coating. This became a win-win scenario for implementing sites because powder coatings not only eliminate most of the solvent-related air emission concern over the release of volatile organic compounds (VOCs) but also produce a more durable coating. Because powder coatings are non-hazardous, they also increase worker safety by reducing exposure to toxic materials. In the end, the use of powder coatings avoids air pollution, improves the product, protects the worker, and removes most of the cost and liability associated with hazardous waste!





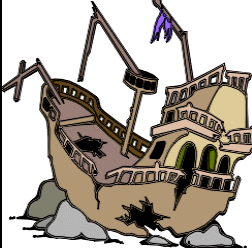
**Figure 4. P2 Benefits: Switching to Powder Coating**



### 2.3.3 P2 Benefits Summary:

- ♦ Reduces total ownership cost
- ♦ Reduces program risk
- ♦ Enhances operational readiness by minimizing the environmental challenges associated with the life-cycle of a weapon system
- ♦ Reduces health and safety risks to personnel while protecting the environment
- ♦ Enhances compliance posture
- ♦ Encourages process improvements to increase productivity and quality

**Table 1. The P2 Perspective (When Implementing P2, The Sooner, The Better!)**

Concept Exploration	Program Definition & Risk Reduction	Engineering & Manufacturing Development	Production, Fielding/Deployment, & Operational Support	Demilitarization & Disposal
 <p>How can I build a system that's safer for the sailor and better for the environment?</p>	 <p>How can I avoid Hazardous Material and reduce or eliminate waste?</p>	 <p>Can I ensure my processes don't require Hazardous Material for maintenance; saving money ashore and afloat on protective equipment, handling, and storage?</p>	 <p>Can waste be reduced or eliminated; can routine maintenance be reduced?</p>	 <p>Can all material be re-used or recycled?</p>

## 2.4 The Need for P2

### 2.4.1 P2 Is a Life-Cycle Tool

Consider the entire life-cycle of a weapon system. Throughout the different acquisition phases there are areas where environmental impacts and requirements must be considered and addressed (See Table 2). These efforts require major investments in time and money. However, integrating P2 into the life-cycle of a weapon system — anywhere in the process — can help preserve the environment while also saving time and money. For maximum benefit, programming P2 into the life-cycle of a weapon system should begin during “Concept Exploration” (Phase 0), incorporating the work of joint design/build teams assembled from experts in all aspects of the weapon system’s life-cycle. It should also reflect “*lessons learned*” from prior projects to reduce cost and improve performance of the final design.

**Table 2. P2: A Useful Life-Cycle Tool**

<u>ACQUISITION PHASES</u>				
Phase 0	Phase 1	Phase 2	Phase 3	
Concept Exploration	Program Definition & Risk Reduction	Engineering & Manufacturing Development	Production, Fielding, Deployment & Operational Support	Demilitarization & Disposal
<u>ENVIRONMENTAL IMPACT &amp; REQUIREMENT CONSIDERATIONS FOR P2 IMPROVEMENTS</u>				
<ul style="list-style-type: none"> <li>♦ HMMP</li> <li>♦ APB</li> <li>♦ AS/PESHE</li> <li>♦ NEPA</li> <li>♦ SOW/SOO</li> <li>♦ Logistics</li> <li>♦ LCC/TOC</li> <li>♦ ORD</li> <li>♦ MNS</li> </ul>	<ul style="list-style-type: none"> <li>♦ Update HMMP</li> <li>♦ Update APB</li> <li>♦ Update AS/PESHE</li> <li>♦ NEPA</li> <li>♦ SOW/SOO</li> <li>♦ Logistics</li> <li>♦ Update LCC/TOC</li> </ul>	<ul style="list-style-type: none"> <li>♦ Update HMMP</li> <li>♦ Update APB</li> <li>♦ Update AS/PESHE</li> <li>♦ NEPA</li> <li>♦ SOW/SOO</li> <li>♦ Logistics</li> <li>♦ Update LCC/TOC</li> <li>♦ Demil. Plan</li> </ul>	<ul style="list-style-type: none"> <li>♦ Update HMMP</li> <li>♦ Update APB</li> <li>♦ Update AS/PESHE</li> <li>♦ NEPA</li> <li>♦ SOW/SOO</li> <li>♦ Logistics</li> <li>♦ Update LCC/TOC</li> <li>♦ Demil. Plan</li> </ul>	<ul style="list-style-type: none"> <li>♦ Demil Plan</li> <li>♦ Capture Lessons Learned</li> <li>♦ NEPA</li> <li>♦ SOW/SOO</li> </ul>

#### ACRONYMS

APB = Acquisition Program Baseline

AS = Acquisition Strategy

ENV = Environmental

HM = Hazardous Material

HMMP = Hazardous Material Management Plan

LCC/TOC = Life-Cycle Cost/Total Ownership Cost

MNS = Mission Needs Statement

NEPA = National Environmental Policy Act

ORD = Operational Requirements Document

P2 = Pollution Prevention

PESHE = Programmatic Environmental Safety & Health Evaluation

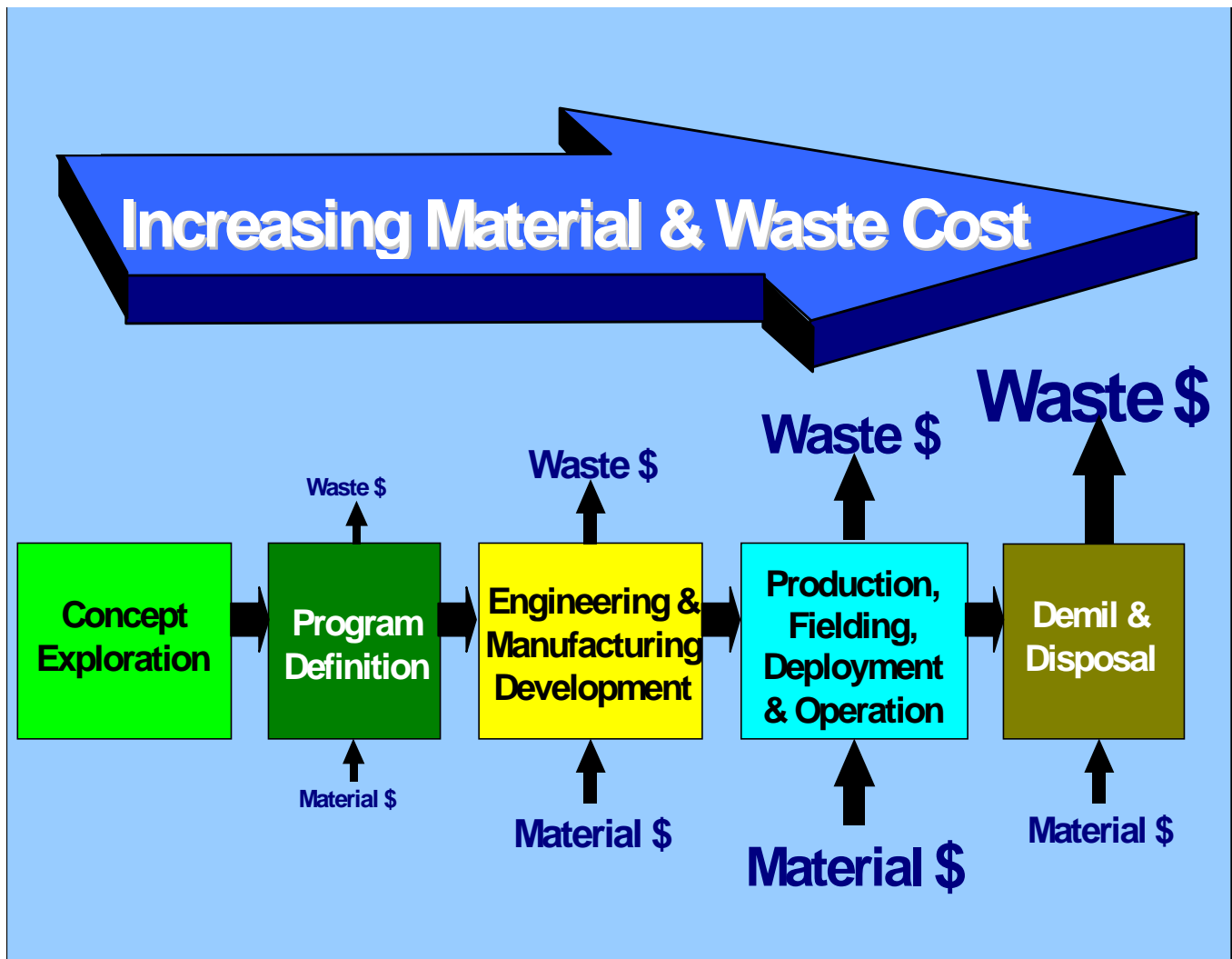
SOO = Statement of Objectives (for Contractors/Sub-contractors)

SOW = Statement of Work (for Contractors/Sub-contractors)

## 2.4.2 P2 Provides Real Benefits

Examining the waste generated by the various materials used throughout the life-cycle allows the highest cost items to be targeted for replacement – often by non-hazardous or less hazardous materials. This is source reduction, the first choice of the P2 hierarchy. Source reduction saves money because it avoids waste generation in the first place! *Implementing P2 during concept exploration provides maximum reduction in total ownership costs!*

**Figure 5. Implementing P2 Early Reduces Total Ownership Cost the Most!**



## 2.5 Where P2 Can Be Programmed In

There is no wrong way to apply P2; but some methods are more effective than others. Remember that P2 can benefit your activity throughout the program life-cycle! Table 3 gives some suggestions of where P2 can be applied.

**Table 3. Where P2 Can Be Programmed In**

Concept Exploration	Program Definition & Risk Reduction	Engineering & Manufacturing Development	Production, Fielding, Deployment & Operational Support	Demilitarization & Disposal
<ul style="list-style-type: none"> <li>◆ Lessons learned about HM usage &amp; associated environmental, safety &amp; health problems from systems with similar mission objectives can help identify where beneficial tradeoff decisions can be made</li> <li>◆ Initiating a PESHE at the earliest possible stage helps identify potential problems</li> <li>◆ Establishing an overall program policy that incorporates P2 into its environmental policy helps improve overall performance.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Technology Transfer can improve a process &amp; make it more efficient — conserving resources or using less hazardous material.</li> <li>◆ Incorporating lessons learned from previous systems can avoid costly disposal &amp; high liability later in the life-cycle.</li> <li>◆ Affirmative procurement policies set at this time can result in the use of recycled material.</li> <li>◆ Put P2 elements in performance specifications.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Material Substitution or reformulation in the earliest phases can reduce toxicity and save money on purchasing, handling, reporting, &amp; disposal, not to mention improving worker safety.</li> <li>◆ Life extension techniques developed &amp; written into ILS documentation in the early life-cycle phases can allow longer usage of material, thus reducing overall purchase and disposal costs.</li> <li>◆ Put P2 elements in performance specifications.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Procedural changes captured up front in the technical manuals and Maintenance Requirement Cards can allow substitution of less hazardous materials and cost reduction afloat and ashore.</li> <li>◆ Re-use philosophies captured and shared can extend life of material and reduce disposal costs.</li> <li>◆ Put P2 elements in performance specifications.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Best Management Practices for disposal when shared among programs can save many dollars in development costs &amp; provide a wealth of lessons learned.</li> <li>◆ Implementing recycling ideas can reduce waste disposal costs.</li> <li>◆ Put P2 elements in performance specifications</li> </ul>

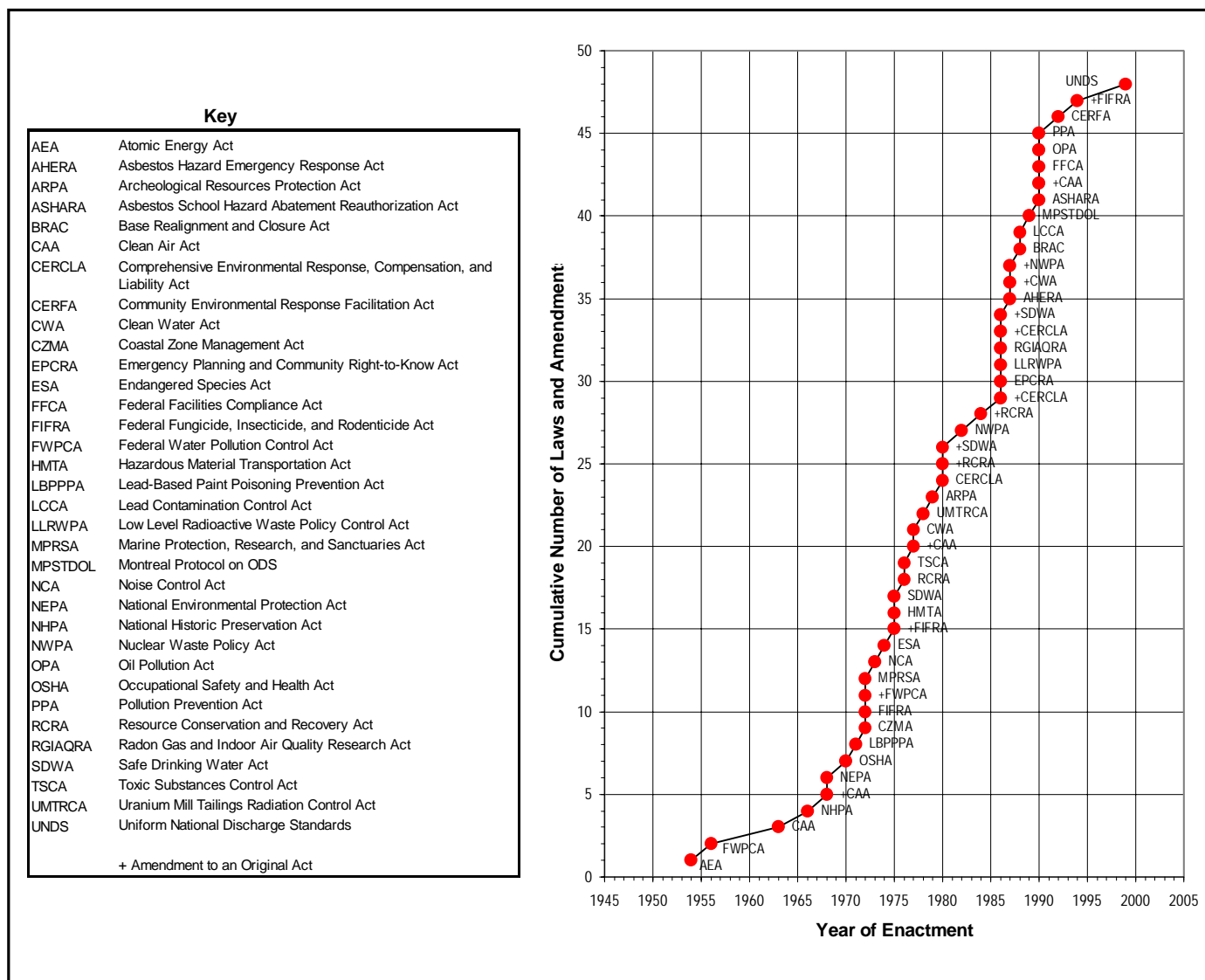
# III. REQUIREMENTS: P2 Drivers

## 3.1 Overview of Legislative & Regulatory History

### 3.1.1 P2 Legislative Drivers

The number of environmental laws promulgated over the last few decades has increased exponentially. These new and changing laws continually raise compliance issues and the threat of environmental civil and criminal penalties. A smart business operation will account for these issues when planning, implementing, or operating new systems or projects.

**Figure 6. The Increasing Number of Environmental Laws**





## **3.2 P2 Requirements**

Following are the definitions of primary legislative and Executive Order (EO) requirements mandating P2 actions and defining the NAVSEA P2 program.

### **3.2.1 P2 Legislative Drivers**

#### **♦ The Pollution Prevention Act (PPA)**

Congress passed the PPA in 1990, calling pollution prevention a “national objective” and declaring that “source reduction is fundamentally different and more desirable than waste management and pollution control.”



*“Pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.”*

#### **♦ The Emergency Planning and Community Right-to-Know Act (EPCRA)**

EPCRA was signed into law in 1992. It mandates Federal facilities comply with local emergency response plans and provide information about listed toxic chemicals to the general public, upon request, through Local Emergency Planning Committees (LEPCs). It also requires facilities to identify the type and quantity of listed toxic chemicals that are being used, and/or released into the environment if use exceeds certain levels. These releases are reported to the EPA and DoD as the Toxic Release Inventory.

#### **♦ The Federal Facilities Compliance Act (FFCA)**

The FFCA was signed into law in 1992. It subjects all Federal agencies to all substantive and procedural requirements of Federal, State, and local solid and hazardous waste laws in the same manner as any private party. The Act authorizes State and Federal environmental regulatory agencies to assess and collect fines and penalties at Navy installations for noncompliance with solid and hazardous waste laws.

### **3.2.2 P2 Executive Orders**

#### **♦ EO 12088 – Federal Compliance with Pollution Control Standards**

Signed on 13 October 1978, EO 12088 requires Federal agencies to cooperate with the EPA, State, and local agencies in the prevention, control, and abatement of pollution.

#### **♦ EO 12856 – Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements**

Signed on 3 August 1993, EO 12856 requires Federal agencies to comply with the provisions of EPCRA and the PPA.



- ♦ **EO 13101 – Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition**

Signed on 14 September 1998, it supercedes EO 12873, requiring the head of each executive agency to incorporate waste prevention and recycling into the agency’s daily operations, and work to increase and expand markets for recovered material. It also tasks a Federal Environmental Executive to develop a Government-wide Waste Prevention and Recycling Strategic Plan.

*Together, these EOs direct Federal agencies to conduct P2 planning, practice source reduction, increase recycling, implement cost-effective waste reduction practices, and make sound life-cycle decisions.*

### 3.2.3 DoD and Navy P2 Requirements

- ♦ **DoD Regulation 5000.2-R and SECNAVINST 5000.2**

DoD Regulation 5000.2-R (SECNAVINST 5000.2 references the DoD Regulation) states,



*“in designing, manufacturing, testing, operating, maintaining, and disposing of systems, all forms of pollution shall be prevented or reduced at the source whenever feasible...*

*...establish a pollution prevention program to help minimize environmental impacts and the life-cycle costs associated with environmental compliance.”*

- ♦ **DoD Instruction 4715.4**

DoD Instruction 4715.4 states, *“It is DoD policy to reduce the use of hazardous materials (HM), the generation or release of pollutants, and the adverse effects on human health and the environment caused by DoD activities.”*

It also states that it is DoD policy to accomplish these objectives by using a management approach that *“emphasizes pollution prevention and incorporates P2 at installations, and into all phases of acquisition, operations, maintenance, support and the ultimate disposal of weapon systems over the system life-cycle.”*

- ♦ **OPNAVINST 5090.1**

OPNAVINST 5090.1 expresses the need for the Navy to *“take action to prevent pollution and to decrease the release of pollutants into the environment.”*

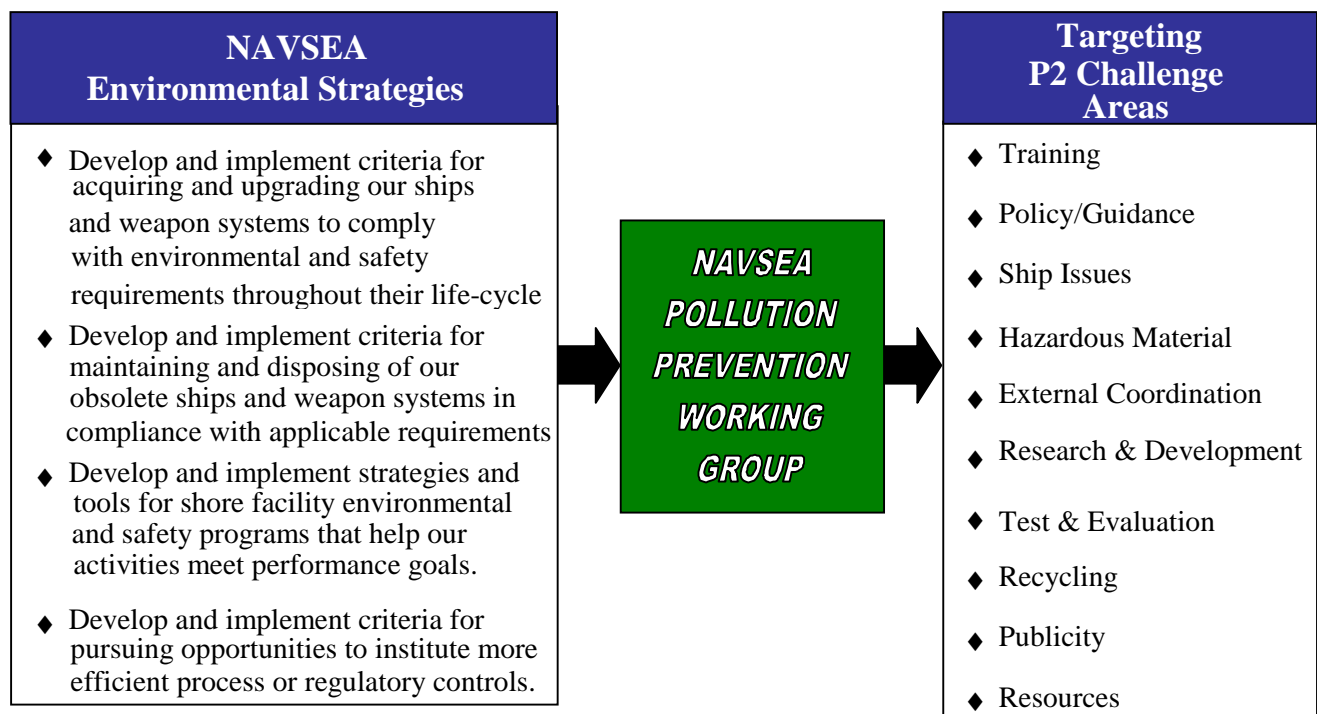
### 3.2.4 NAVSEA Strategies & Focus Areas

NAVSEA has developed a P2 Program Management Plan to support Navy and DoD P2 objectives and help focus the efforts and resources of the entire NAVSEA community. Here's a brief introduction to the NAVSEA P2 Program Management Plan and its focus areas.

NAVSEA believes that P2 can and should be a cost-effective method of sustaining compliance. Whenever possible, NAVSEA activities, programs and organizations should reduce the amount of waste or pollution generated under their areas of responsibility by implementing up-front design, modernization, technical and logistics planning, and documentation measures. This is consistent with the P2 commitment reflected in the NAVSEA Environmental Strategic Goal.

NAVSEA has identified four environmental strategies in the NAVSEA Strategic Plan. From these four strategies, the [\*NAVSEA P2 Working Group\*](#) has targeted nine P2 challenge areas to help activities and organizations focus their efforts in developing P2 oriented environmental programs.

**Figure 7. NAVSEA Strategies & P2 Challenge Areas**



## **IV. DIAGNOSIS:**

### **How to Identify & Evaluate P2 Opportunities**

#### **4.1 P2 Assessments & Opportunities**

The following steps are a roadmap for your activity to follow to get the most out of what P2, as a life-cycle and systems engineering tool, has to offer.

##### **4.1.1 Before You Start**

Before you begin the task, keep a few things in mind:

- ♦ ***P2 is a Life-Cycle & Systems Engineering Tool***

P2 should be more than adding on a few minor changes somewhere in the production process.



***Integrating P2 into your program early maximizes the benefits!***

- ♦ ***Search for the Root Causes***

P2 involves identifying the root cause(s) of pollution and finding ways to minimize its creation. *Begin the endeavor expecting all the available skill, creativity, and know-how of your organization needs to be leveraged and utilized.*

- ♦ ***Now You're Ready to Begin!***

##### **4.1.2 P2 Assessment**

To identify how much P2 can help your activity, first identify where there is room for improvement. The three steps listed are part of this first phase: P2 Assessment.

###### **4.1.2.1 Assemble and Organize the P2 Team**

The first step should go without saying: Establish a P2 Team. Since P2 is a total systems engineering tool and life-cycle process, the Team should include individuals from all areas of the organization.

###### **a. Membership:**

Consider the following individuals for membership on the P2 Team:

- |   |                     |                                 |
|---|---------------------|---------------------------------|
| ♦ Participating managers                | ♦ Process operators | ♦ Design personnel              |
| ♦ Process owners                        | ♦ Prime contractors | ♦ Line supervisors              |
| ♦ Facility engineers                    | ♦ Safety vendors    | ♦ Logisticians                  |
| ♦ Hazardous waste/material coordinators | ♦ System engineers  | ♦ Environmental representatives |

If your activity already has a P2 Team, it may be wise to revisit the membership and consider adding new members to the group. A fresh, or alternative perspective provided by new individuals could yield unexpected results.

## b. Communication:

Everyone on the P2 Team should know the basics: what P2 is, what it means to their particular activity or organization, and how it impacts their jobs. Members should also know the purpose behind the P2 Team's efforts: to incorporate P2 process improvements, work habits, and principles into the design and operation of the organization's various processes. Lastly, the Team should meet regularly and keep each other informed to promote information sharing and make the best use of limited resources.

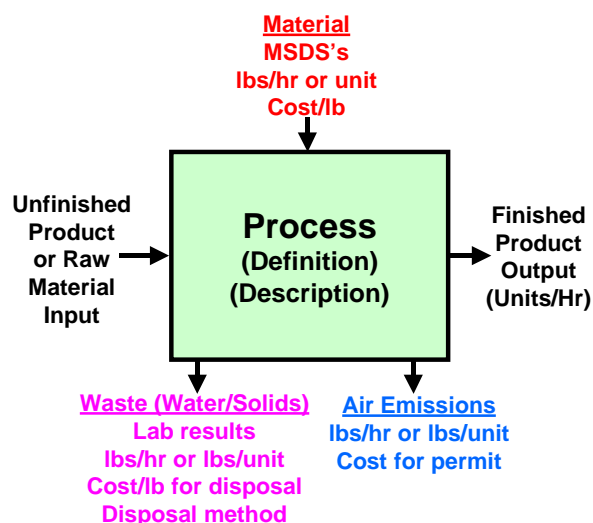
### 4.1.2.2 Use Metrics to Find Potential Problems

Once the P2 Team is up and running, have them gather relevant data that can be analyzed to identify program areas needing improvement and later tracked to calculate progress. This sort of information is known as metrics and is described in detail in [P2 Metrics](#).

### 4.1.2.3 Investigate and Document Your Processes

In addition to analyzing metrics, it is useful for the P2 Team to investigate and document the activity's various processes to identify P2 opportunities.

- ◆ Gather data on material and resource inputs (including cost and usage rates)
- ◆ Gather data on waste generation (rates of generation and disposal costs)
- ◆ Gather data on process operation (continual operation or batch jobs)
- ◆ Gather data on output product quality (how clean, how smooth...why?)
- ◆ What is unique about this process? (compare to industry)
- ◆ Is personal protective equipment required?
- ◆ Is equipment outdated or lacking maintenance?

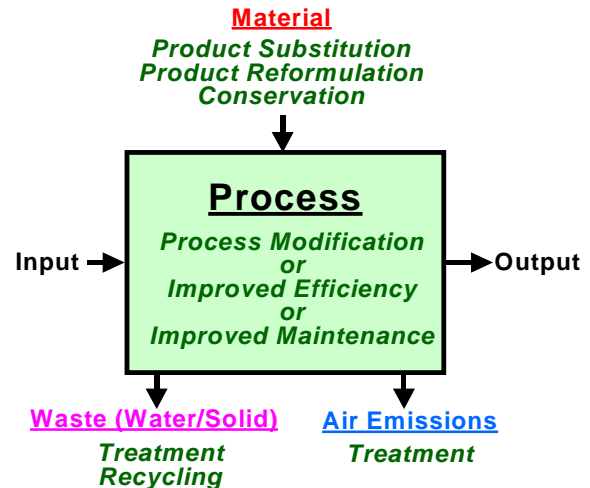


### 4.1.3 P2 Opportunities:

After identifying areas for improvement, start cataloging all the ways P2 can benefit your organization. There are three steps of this second phase: P2 Opportunities.

#### 4.1.3.1 Brainstorm for Opportunities

- ◆ Host a brainstorming session
- ◆ Identify P2 opportunity areas
- ◆ Draw a process map or flowchart
- ◆ Examine inputs, outputs, and process steps looking for ideas
- ◆ Gather all ideas for later analysis



#### 4.1.3.2 Analyze P2 Opportunities

- ◆ Gather all relevant data
- ◆ Examine risk
- ◆ Compare new opportunity cost/risk versus existing opportunity cost/risk
- ◆ Examine ideas for winners and losers by examining data (pare ideas down to the best)
- ◆ Gather more data on the best ideas (talk to vendors, other people who own similar process, etc.)
- ◆ Examine costs and payback between new opportunities and existing method
- ◆ Compare risk/cost/payback between opportunities

#### 4.1.3.3 Implement P2 Opportunities

- ◆ Prioritize identified opportunities
- ◆ Seek “P2 champions” for various opportunities
- ◆ Seek sources of funding for various opportunities

## **4.2 P2 Tools**

### **4.2.1 P2 Metrics**

P2 metrics provide a way for the P2 Team to define potential program trouble spots. Metrics provide real and practical benefits. Initiating a metrics program using existing tools will also help people get a better “feel” for their various processes.

Metrics are effective in problem solving only when processes are defined. Keep in mind that they are not “silver bullets.” Having metrics data will not fix all problems. Rather, metrics need to be part of a “system” perspective. Simply stated, metrics are measurements made of defined processes. Comparing metric data against a baseline makes it possible to decide whether the situation is “good” or “bad” (or meeting goals or targets). Corrective action can then be taken based on the facts.

#### **The Benefits of Metrics:**

- ◆ Provide reliable hard data
- ◆ Provide true status of projects to permit insight into potential problems
- ◆ Offer control of products and processes
- ◆ Identify necessary improvements
- ◆ Allow focus on which processes can be improved and how

#### **Characteristics of Good Metrics:**

- ◆ Fewer are better
- ◆ Linked to key business drivers
- ◆ Mix of past, present, and future
- ◆ Targets/goals based on research facts
- ◆ Balanced over several areas

**Table 4. Examples of Some P2 Metrics:**

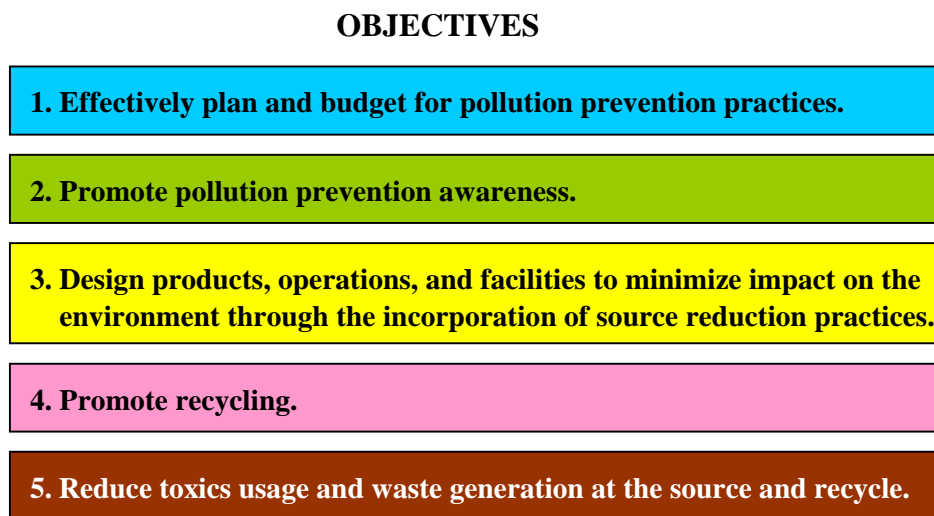
<b>Metrics to Target P2 Opportunities</b>	<b>Metrics to Measure P2 Progress</b>
<ul style="list-style-type: none"><li>◆ Examine waste collection/handling/disposal data for large, expensive, or toxic waste streams.</li><li>◆ Examine hazardous material usage data for large, expensive, or hazardous substances.</li><li>◆ Examine past inspection data for compliance problems.</li><li>◆ Examine lessons learned.</li></ul>	<ul style="list-style-type: none"><li>◆ Examine waste collection/handling/disposal data for trends by process.</li><li>◆ Examine hazardous material usage data for unexplained trends.</li><li>◆ Set waste reduction goals by comparing amounts/toxicity of process waste to similar processes in the Navy or public sector.</li></ul>

#### 4.2.1.1 NAVSEA Field Activity Metrics

The P2 perspective of the Environmental Performance Balanced Scorecard provides the basis for determining if an environmental program is achieving continuous improvements in the quality of environmental practices with the overall goal of reducing risks to human health and the environment via P2-oriented strategies.

Metrics developed by a NAVSEA Process Action Team for shore activities recommended five objectives to analyze the performance of the P2 portion of NAVSEA environmental programs, with each objective translated into specific measures:

**Figure 8: NAVSEA Field Activity P2 Metric Objectives**



#### 4.2.1.2 Other Program Metrics

- ◆ DoD P2 Metrics on the DENIX web page (search for P2 metrics on the PUBLIC page).  
**LINK:** <http://www.denix.osd.mil/denix>

#### 4.2.2 Risk Analysis

Due to the uncertainty associated with any project, it is also necessary to assess any risks associated with a potential P2 opportunity. *Risk analysis should be the first area examined when evaluating a proposed P2 project's or program's benefit to the Navy.* These three primary areas of risk should always be considered:

- ◆ Environmental (What are the releases to the environment and consumption of resources, etc.).
- ◆ Personnel safety issues (Is PPE required; is the material a carcinogen, etc.?)
- ◆ Legal (Will waste be destroyed or buried, and will it be a liability for years to come?)

#### 4.2.2.1 Risk Assessment Guides

Sources of help for measuring, evaluating, and comparing possible risks include:

- ♦ Military Standard 882 provides requirements for developing and implementing a system safety program. Such a program acts to identify the hazards of a system and to impose design requirements and management controls to prevent mishaps by eliminating hazards or reducing risks. This document can be found at (SEARCH for Mil-Std-882):  
**LINK:** <http://assist.daps.mil/>
- ♦ EPA has been focusing on refining its ecological, human health and welfare risk analyses capabilities over the last decade in an attempt to better understand the nature of today's environmental problems and their implications for the future. While no single definitive analysis framework has been developed, useful information can be found at (SEARCH for “environmental risk”):  
**LINK:** <http://www.epa.gov/>

#### 4.2.2.2 Simple P2 Project Risk Evaluation

If a detailed analysis of risk is not required, the following basic risk assessment process will help to determine the level of risk associated with a project by examining its relative environmental, personnel safety, and legal risks. This type of assessment is useful for making a quick assessment of the value of various P2 opportunities. This can be done by answering the following six questions and placing a *CHECK* in each line of the matrix below as appropriate (text in the matrix gives guidance on your selection).

- a. Is there a risk-shift? For example, when comparing the waste streams from the existing process to the proposed opportunity, does implementation merely cause the waste to shift from one media to another (e.g., going from a solid waste to a gaseous waste)?
- b. Is there a greater/lesser potential for a fine from a release? (e.g. changing the waste from a solid to a liquid means a spill would have to be contained or it could be released to a storm drain)?
- c. What is the probability that a spill or release could occur?
- d. What is the impact on safety? For example, are there new products requiring personnel protection equipment? Or, is it harmful if inhaled, exposed to skin, eyes, etc.?
- e. What is the probability that a human exposure could occur and what is the health risk of the exposure?
- f. What is the long-term liability for waste disposal? For example, is the waste going to be in a landfill for 100 years or can it be recycled or effectively destroyed (e.g. incineration)?



**Table 5. Simple Risk Evaluation**

ITEM	LOW RISK	MEDIUM RISK	HIGH RISK
Risk Shift	___ No Shift	___ Partial Shift	___ Major Shift
Fines	___ No Threat	___ Some Threat	___ Very Likely
Spill/Release	___ No Threat	___ Some Threat	___ Very Likely
Safety Risk	___ Little or None	___ Slight	___ Very High
Human Exposure	___ No Threat	___ Some Threat	___ Very Likely or High Health Risk
Disposal Risk	___ No Hazard and No Risk	___ Waste Can Be Recycled or Destroyed	___ Long Lived Waste
TOTAL	___ Total # Checks in this Column	___ Total # Checks in this Column	___ Total # Checks in this Column

**NOTE:** This is NOT an all-inclusive method, but does represent a simple means for comparing risk among various alternatives.

### Determining Results

- If there are any checks in the **HIGH RISK** column, serious consideration should be given to scrapping the P2 opportunity. At the very least, the opportunity must be carefully re-evaluated against the existing process, factoring the risk into the cost/benefit analysis to ensure there is sufficient reason for continuing.
- If there are any checks in the **MEDIUM RISK** column, a determination must be made by comparing the proposed risk against the risk of the existing process. If the risk of the proposed implementation is higher, the opportunity should be re-evaluated to ensure the risk was factored into the cost/benefit analysis.
- If all checks appear in the **LOW RISK** column, implementation can proceed.

## 4.2.3 P2 Cost and Benefit Analysis

### 4.2.3.1 Why Analyze Costs?

Cost is the primary driver for all decisions made by any business. Every decision made has a cost impact on the overall life of the business. If a decision or project has a negative cost benefit, there is little reason for moving forward with it. *At first glance, P2 opportunities, although environmentally beneficial, may not appear to be in the best interest of the Navy. However, in the long run, many P2 opportunities (new technologies, process changes, up-front design considerations) make more than just environmental sense, they also make economic sense. Cost analysis is one tool that can be used to ensure that a decision developed by a P2 assessment is in the best interest of the Navy.*



*Cost analysis is the most important tool for gaining approval for any P2 opportunity!*

### 4.2.3.2 What Costs?

The Navy has two classes of costs: direct and indirect (or overhead). Direct costs are distinctly tied to the project, platform, or mission. Indirect costs *support* the performance of the project, platform, or mission of the Navy (may be considered the price of doing business). The two main direct cost categories the Navy accounts for are labor and materials. Labor costs pay someone to do work, including time and benefits, while material costs encompass all other non-labor costs.

Many other costs are present, but they are typically indirect. These hidden or concealed costs are usually lumped together and accounted for as overhead. However, while they may be difficult to detect, concealed costs often contribute a substantial amount to the overall cost of a project. They can very easily make or break a proposal. Thus, some attempt should be made to estimate their contribution to a project's total cost. Some examples of characteristic and concealed costs are shown in Table 6.

**Table 6. Characteristic vs. Concealed Navy Costs**

Characteristic Costs	Concealed Costs
<ul style="list-style-type: none"><li>♦ Painter Labor and Benefits</li><li>♦ Sailor Labor and Benefits</li><li>♦ Lubricating Oil</li><li>♦ Sheet Metal</li><li>♦ Electricity</li><li>♦ Waste Disposal</li></ul>	<ul style="list-style-type: none"><li>♦ Depreciation</li><li>♦ Demolition &amp; Clearing</li><li>♦ Training</li><li>♦ Hazardous Material Storage/Handling</li><li>♦ Compliance Inspections and Monitoring</li><li>♦ Environmental Fees</li><li>♦ Federal Employee Compensation Act (FECA)</li></ul>

### 4.2.3.3 Cost-Benefit Analysis

Economic cost-benefit analysis is the technique used to compare the economic benefits of a proposed project against its costs. If the benefits of a proposed project are greater than its costs, it should be implemented. If a project is not *cost effective*, it will not be implemented. This is a general rule of thumb, unless there are associated ethical, health, or ecological issues, it will not be implemented. This sort of analysis normally is labor intensive and must be done by people

trained to do economic analyses. However, the Environmental Protection Agency (EPA) developed a cost analysis package called *P2 Finance* that is easy to use without knowing the details of conducting a cost analysis.

Based on the EPA *P2 Finance* package, the NAVSEA P2 Working Group has developed a Navy-specific P2 Finance Template. This Template uses common Navy values for inflation rates and other important numbers for effective, but easy cost analysis. The Template (and instructions for its use) is on the Pollution Prevention portion of the SEA 00T Homepage Intranet site under “Working Group Projects.” **LINK:** <http://corp.navsea.navy.mil/>

#### **4.2.4 Up-Front P2**

P2 works best when integrated at the beginning of a program or “programmed into” the up-front design of a weapon system. This requires an acquisition and contracting strategy.

##### **4.2.4.1 The Basic Steps in the Acquisition Process**

There are six basic steps in the acquisition process. There are many points throughout this process where environmental, safety, and health considerations can be considered, weighed, and integrated into the overall program design and development.

- a. Operational Requirements Document
- b. Acquisition Strategy
- c. Develop Procurement Request
  - ♦ Statement of Work (SOW)
  - ♦ Statement of Objectives (SOO)
  - ♦ Performance Specifications
- d. Request for Proposal
- e. Proposal Evaluation
- f. Contract Award

The Acquisition Strategy document is one of the best places for programming in P2 because it outlines how the overall program will evolve. This document should detail how the program intends to address programmatic ESH considerations.

DOD 5000.2-R requires consideration of environmental issues (regardless of ACAT level) during all phases of the acquisition process, and at each milestone.



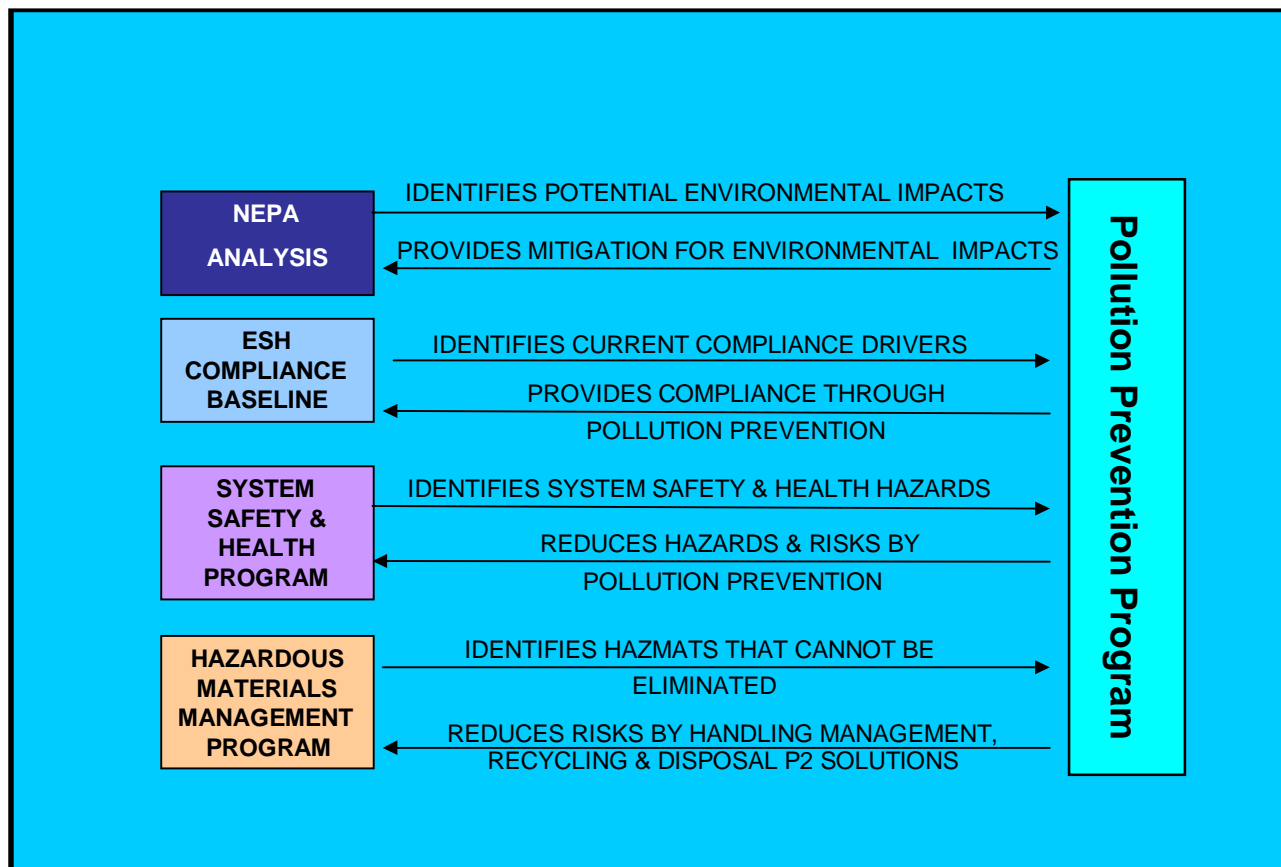
***DoD 5000.2 requires all programs, regardless of acquisition category, to comply with environmental, safety, and health (ESH) requirements.***

**LINK:** <http://www.acq.osd.mil/sa/asm/product.html> (DoD 5000 documents)

The PESHE is the program manager's strategy for complying with these ESH requirements. It establishes environmental, safety, and health responsibilities (ESH roadmap for execution) for the program from start to finish. The PESHE identifies how progress will be tracked and gives information for making milestone decisions. All PESHEs cover five major topics:

- ♦ National Environmental Policy Act
- ♦ Environmental compliance
- ♦ System safety and health
- ♦ Hazardous materials
- ♦ Pollution prevention

**Figure 9. P2's Relationship with Other ESH Considerations**



## **4.3 P2 Technologies**

Some P2 solutions are pure common sense, but others are harder to grasp and may require a technology study to see if a solution exists or must be researched. DoD and the Navy have established several programs to find or develop technology for P2. These programs can be broken into two general areas:

### **4.3.1 Technology Research and Development**

- ◆ **SERDP** (Strategic Environmental Research and Development Program) – Initiated by Congress and funded by DoD, the SERDP primarily supports acquisition phases 0 and 1 in the development of new technologies and/or technology transfer for designated thrust areas. For these areas, SERDP identifies, develops, and transitions environmental technologies that relate directly to defense mission accomplishment.
- ◆ **ESTCP** (Environmental Security Technology Certification Program) – Funded by DoD, ESTCP primarily supports acquisition phases 1 and 2. The program seeks to target the most urgent environmental needs based on return on investment and demonstrate/validate the most promising innovative technologies and transition them to the fleet.
- ◆ **JG-PP** (Joint Group on Pollution Prevention) – JG-PP is a partnership between various commercial industries and government organizations to assist in validating and implementing changes to common or jointly used materials and processes that are less hazardous than those currently used in military and industrial facilities.
- ◆ **SBIR** (Small Business Innovative Research) – DoD's Small Business Innovative Research program funds early-stage R&D projects at small technology companies; the projects serve a DoD need and have the potential for commercialization in private sector and/or military markets. The program is part of a larger Federal program administered by ten Federal agencies. **LINK:** <http://www.acq.osd.mil/sadbu/sbir/>

### **4.3.2 Applying Existing Technology**

- ◆ **NELP** (Navy Environmental Leadership Program) – NELP seeks improvement in four thrust areas (clean-up, compliance, conservation, and pollution prevention) by focusing leadership on exporting technological successes Navy-wide to speed clean-up, maintain compliance, and save money. NELP activities serve as test beds for new and innovative technologies and focused management to address environmental issues and export their successes throughout the Navy. Two Navy shore installations are designated to perform the NELP mission: Naval Air Station North Island in Coronado, California; and Naval Station Mayport in Mayport, Florida. **LINK:** <http://www.nelp.navy.mil/>

- ♦ **FASTT** (Fleet Assistance Support and Technology Transfer) – FASTT is a joint program of NAVSEA and NAVAIR to reduce the cost of environmental compliance and improve maintenance work processes using the best technology and management practices available. The FASTT Team performs on-site assessments of maintenance processes and environmental requirements from the viewpoint of the fleet operator. The goal is to find maintenance solutions that protect the environment and reduce the workload or cost to the customer. The Team's services include assistance with cost-benefit analyses for equipment purchases and installation justification.
- ♦ **PPEP** (Pollution Prevention Equipment Program) – PPEP provides a source of funding for activities (other than Navy Working Capital Fund activities) to acquire commercially available P2 equipment. This equipment assists in managing hazardous material, reducing solid and hazardous waste, increasing productivity, improving worker safety, or meeting compliance requirements while providing a substantial saving to the Navy.

**LINK:** <http://www.lakehurst.navy.mil/p2/index.htm>

- ♦ **P2 Afloat** (Pollution Prevention Afloat Program) – This Navy-sponsored program seeks to reduce or eliminate the excess HM generated by Navy ships. The objective of the P2 Afloat Program is to implement tools and processes in the fleet to facilitate P2 practices in daily operations and maintenance procedures by relying on commercial off-the-shelf equipment. The P2 Afloat Program identifies opportunities as tools that effectively reduce shipboard use of HM. Reduction is accomplished by using products or processes to reduce HM including reuse, recycling, or the substitution of less-hazardous materials. The P2 Afloat Team tests and evaluates all opportunities on designated prototype ships. An opportunity is deemed successful if it has a 3-year or less return on investment or offers substantial non-quantitative benefits such as improving safety and health aboard ship. Successful opportunities are transitioned to the fleet.

**LINK:** <http://www.dt.navy.mil/code60/code63/code632/p2programs/p2afloat/index.htm>

- ♦ **P2 Library** – This is a joint-service program that provides a comprehensive source of P2 information. The library is comprised of four elements: the P2 Opportunity Handbook, the PPEP equipment book, the DLA Environmental Products catalog, and a link to JG-PP. Also available are the Navy's Environmental Quality Fact Sheets suggesting applications for P2 equipment. **LINK:** <http://enviro.nfesc.navy.mil/p2library>

### 4.3.3 Recent P2 Technologies

**Figure 10. Hand-held Steam Cleaner & Automatic Cable Cleaner**



Hand-Held Steam Cleaner	Automatic Cable Lubricator
<b>P2 Benefits:</b>	<b>P2 Benefits:</b>
♦ Increases worker safety	♦ Reduces labor
♦ Eliminates solvent waste	♦ Minimizes waste grease
♦ Eliminates solvent air emissions	♦ Reduces amount of hazardous waste rags

**Figure 11. Environmentally Controlled Paint Booth & Paint Dispensers**



Environmentally Controlled Spray Booth	Paint Dispensers
<b>P2 Benefits:</b>	<b>P2 Benefits:</b>
♦ Achieves cost & labor savings	♦ Reduces wasted paint
♦ Reduces paint usage & associated VOCs	♦ Centralizes management
♦ Improves corrosion control	♦ Reduces spills & clean-up

For more information about afloat and ashore P2 technologies visit the Navy Shipboard Environmental Information Clearinghouse P2 and HM page.

**LINK:** <http://www.navyseic.com/index3.htm>



## **V. SOLUTIONS: How Others Did It**

### **5.1 Case Studies**

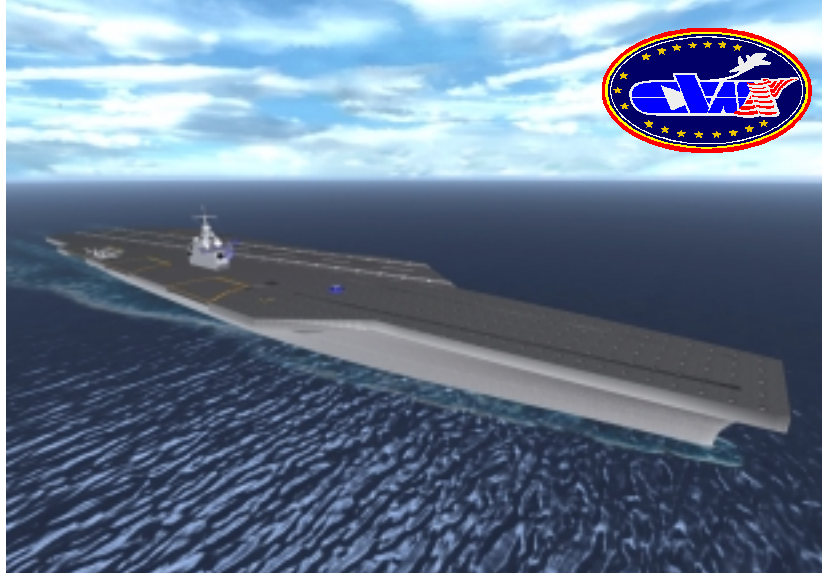
Many organizations throughout NAVSEA acquisition, afloat, and ashore communities are incorporating P2 practices and initiatives into how they do business. Consequently, *the organizations highlighted here have saved money, lowered their liability profile, minimized risks to human health and the environment, and reduced their data management needs by successfully engineering P2 work habits, practices, and processes into their programs.* The following case studies are presented to illustrate how P2 can help an activity. *Remember, for P2 to be truly successful as a systems engineering tool and life-cycle process, it must be “programmed in” and therefore fully integrated into an activity’s thinking – ultimately becoming another routine part of doing business.*

#### **5.1.1 Acquisition Case Study: Up-Front P2 Design**

##### **The Problem:**

The CVNX Carrier Program's mission is to develop a carrier for the 21st century; maintaining the carrier's core capabilities while making it more adaptable to future changes and improving its affordability.

**Figure 12. CVNX Carrier**



##### **CVNX Acquisition:**

- ♦ Includes P2 in design considerations
- ♦ Minimizes total ownership costs
- ♦ Minimizes dependence on HM
- ♦ Minimizes risks to human health and the environment

##### **The Solution:**

The CVNX will be acquired in an evolutionary manner and at a prudent pace – achieving intended results with delivery of CVNX2 by 2018. *Since the CVNX program is in its early stages, a thrust is being made to include ESH improvements (including P2) into each design opportunity through the total ship systems engineering process.*



### **The Benefits:**

*The scope of these improvements in the acquisition of the CVNX will span cradle-to-grave considerations to minimize total ownership costs.* In addition, programmatic requirements require the CVNX to release any form of pollution to the environment only as a last resort while minimizing risks to the environment and personal health. *The CVNX will operate to minimize dependence upon HM throughout its life-cycle.*

### **5.1.2 Afloat Case Study: P2 Technologies Aboard LSD 41**

#### **The Problem:**

The LSD 41 Class is often assigned duties as Primary Control Ship to organize and execute waterborne assaults. The ship is designed to be a boat haven and to render docking and repair services to small ships, boats, and landing craft. It is the first ship built to embark and support the U.S. Navy's new Air Cushion Landing Craft. Normal maintenance practices on these ships required the storage and handling of a large number of hazardous chemicals, the disposal of large volumes of waste, and the expenditure of a large number of man hours.

**Figure 13. LSD 41 Class**



#### **P2 Technologies Afloat:**

- ♦ Minimize storage and handling of HM
- ♦ Minimize handling and disposal of used/excess HM
- ♦ Reduce/eliminate worker exposure to harmful materials
- ♦ Reduce labor hours expended
- ♦ Improve overall safety and health of the work environment
- ♦ Decrease budget wasted on procurement of unnecessary HM

#### **The Solution:**

To better support the mission of the LSD 41 Class, a prototype suite of P2 equipment was tested onboard USS Rushmore (LSD 47), the amphibious SMART ship. This test and evaluation targeted the top waste streams of the LSD 41 Class such as paint waste, used solvents, and oily/greasy rags.

#### **The Benefits:**

*Many commercial off-the-shelf (COTS) P2 systems have been successfully tested and are currently being planned for use on all LSD 41 Class ships.*

### 5.1.3 Ashore Case Study: Aqueous Parts Washers

#### The Problem:

Large open-air solvent dip tanks, used to clean parts of grease and grime, utilized hazardous chemicals and emitted hazardous vapors. This use of solvents increased worker exposure to harmful chemicals and threatened air quality.

**Figure 14. Aqueous Parts Washer**



#### Aqueous Parts Washer Benefits:

- ♦ Minimizes disposal of HW
- ♦ Eliminates worker exposure to carcinogenic chemicals
- ♦ Replaces hazardous solvents with biodegradable detergents
- ♦ Meets State and local air regulations for ozone depleting substances (ODSs)
- ♦ Offers quick payback
- ♦ Reduces cleaning times

#### The Solution:

Aqueous parts washers clean parts in an enclosed environment with a water and detergent solution. They employ high-pressure streams of a heated solution to remove dirt, grime, oil, and grease from objects. Because the solution is biodegradable, it may be discharged into the local sewer system if it meets local discharge limitations. However, most of the washers have an oil removal system, which cleans the solution so it can be reused. *Because the system uses biodegradable detergents, hazardous wastes are minimized, reducing disposal costs.*

#### The Benefits:

Parts washers have been installed in many shore activities and are scheduled for installation on most in-service ships as a substitute for solvent dip tanks and vapor degreasers. Aqueous parts washers can fit almost any need from engine cleaning to large motor generator windings as they come in a variety of sizes, from 75-gallon to 400-gallon capacities.

*Shore facilities and ships with prototyped P2 equipment have found that aqueous parts washers provide payback in less than three years and generate savings after that.*

## 5.2 NAVSEA Success Stories

### 5.2.1 Success & Recognition Are the Rewards for Hard Work

NAVSEA has many outstanding environmental award winners, especially in the area of pollution prevention. These leaders are listed below. Examples of other past NAVSEA P2 award winners can be found on the Defense Environmental Information Exchange (DENIX).

#### **1999 White House Closing the Circle Honorable Mention**

- ♦ **Individual/Team:** P2 Afloat Team, Naval Surface Warfare Center, Carderock Division

#### **1999 Federal Executive Board Awards, Philadelphia Region Honorable Mention**

- ♦ **Individual/Team:** P2 Afloat Team, Naval Surface Warfare Center, Carderock Division

#### **1999 SECNAV P2 Award Winners**

- ♦ **Weapon System Acquisition:** Virginia Class Submarine Program

#### **1999 CNO P2 Award Winners**

- ♦ **Industrial Installation:** Norfolk Naval Shipyard, Puget Sound Naval Shipyard
- ♦ **Weapon System Acquisition:** Arleigh Burke Class Destroyer (DDG 51) Program, Virginia Class Submarine Program

#### **1998 SECNAV P2 Award Winners**

- ♦ **Industrial Installation:** Pearl Harbor Naval Shipyard & Intermediate Maintenance Facility
- ♦ **Weapon System Acquisition:** Pollution Prevention, Individual/Team: Mr. William Boucher, Puget Sound Naval Shipyard

#### **1998 CNO P2 Award Winners**

- ♦ **Industrial Installation:** Norfolk Naval Shipyard; and Pearl Harbor Naval Shipyard
- ♦ **Individual/Team:** Mr. William (Bill) Boucher, Puget Sound Naval Shipyard

#### **1997 White House Closing the Circle Award Winner**

- ♦ **Individual:** Mary Jo Bieberich, Naval Surface Warfare Center, Carderock Division

#### **1996 CNO P2 Award Winner**

- ♦ **Individual/Team:** P2 Afloat Team, Naval Surface Warfare Center, Carderock Division

## **VI. CONTINUAL IMPROVEMENT:** **How to Fine-Tune Your P2 Program**

### **6.1 Training**

The future of the Navy Environmental Program requires well-trained people. Training is provided by NAVSEA through formal courses, as resources are available. P2 is smart business and an invaluable part of an integrated environmental training program. *DoD Vision Statement from the DoD Pollution Prevention Strategy states that P2 should be promoted through "...education, training, and awareness..."*

#### **6.1.1 P2 Training**

The first and easiest step to take to ensure your P2 program will operate smoothly and efficiently is to make sure all personnel have a basic knowledge of what P2 is and how it can help the organization. Fortunately, there are many P2 courses available, ranging from general overview courses to specific courses on P2 program funding and acquisition P2.

The NAVSEA P2 Working Group considers training a top priority for the NAVSEA community and has developed a matrix to identify P2 training requirements. The matrix has been broken down for the acquisition, ashore, and afloat communities. A future link will provide further information on those P2 training requirements.

#### **6.1.2 Training Opportunities**

Navy personnel must stay current with the latest developments in environmental requirements, so a basic understanding of P2 must be established and maintained through environmental training courses and other applicable programs. P2 initiatives that are clearly effective and already in place should be used in training courses to promote good environmental management and show how P2 can reduce life-cycle costs.

NAVSEA 00T has developed a P2 training list, which stems from the primary Navy environmental and safety instructions (OPNAVINST 5090.1 and 5100.23). It includes courses required for environmental managers or staff.

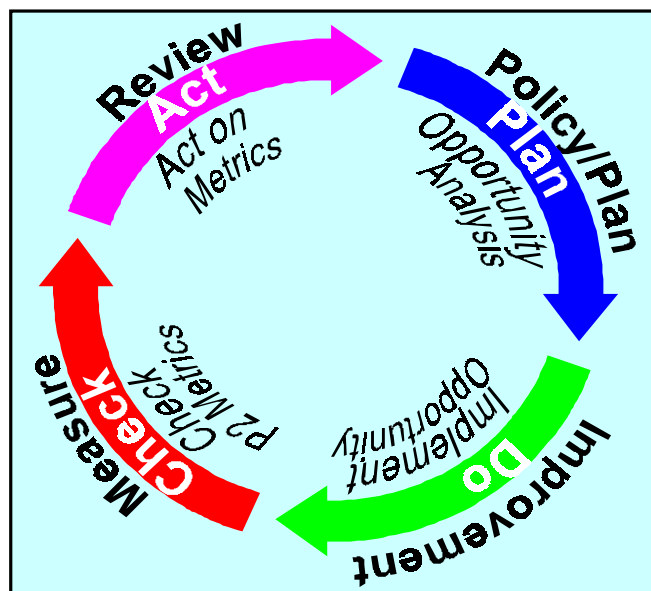
## 6.2 Improvement Systems

There are many different management systems for improving environmental and P2 performance. Most of these are rooted in quality management where the focus is on improving quality for the customer. This is accomplished by having everyone involved improve their process, products, services, and culture through a Plan/Do/Check/Act cycle of continuous improvement.

Examples of some of these improvement systems include Total Quality Management and Malcolm Baldrige. A newer system, which focuses strictly on environmental management, is ISO 14000; it recommends a similar improvement cycle of Policy/Plan/Implement/Measure/Review.

By comparing these two improvement cycles to our typical P2 project cycle presented in Section 4, you can see that whichever philosophy you follow, P2 opportunities must be planned, implemented, reviewed, and re-directed or corrected as necessary to ensure they maximize efficiency and save money. A depiction of ISO 14000, Total Quality, and P2 opportunity implementation actions are shown in Figure 15 in a continuous improvement circle.

**Figure 15. Continuous Improvement in Your P2 Program**



Also of benefit to the P2 manager seeking improvement is the environmental self-assessment guidance on the SEA 00T Homepage Intranet site under “How-to-Guides.”

**LINK:** <http://sea00t.navsea.navy.mil/>

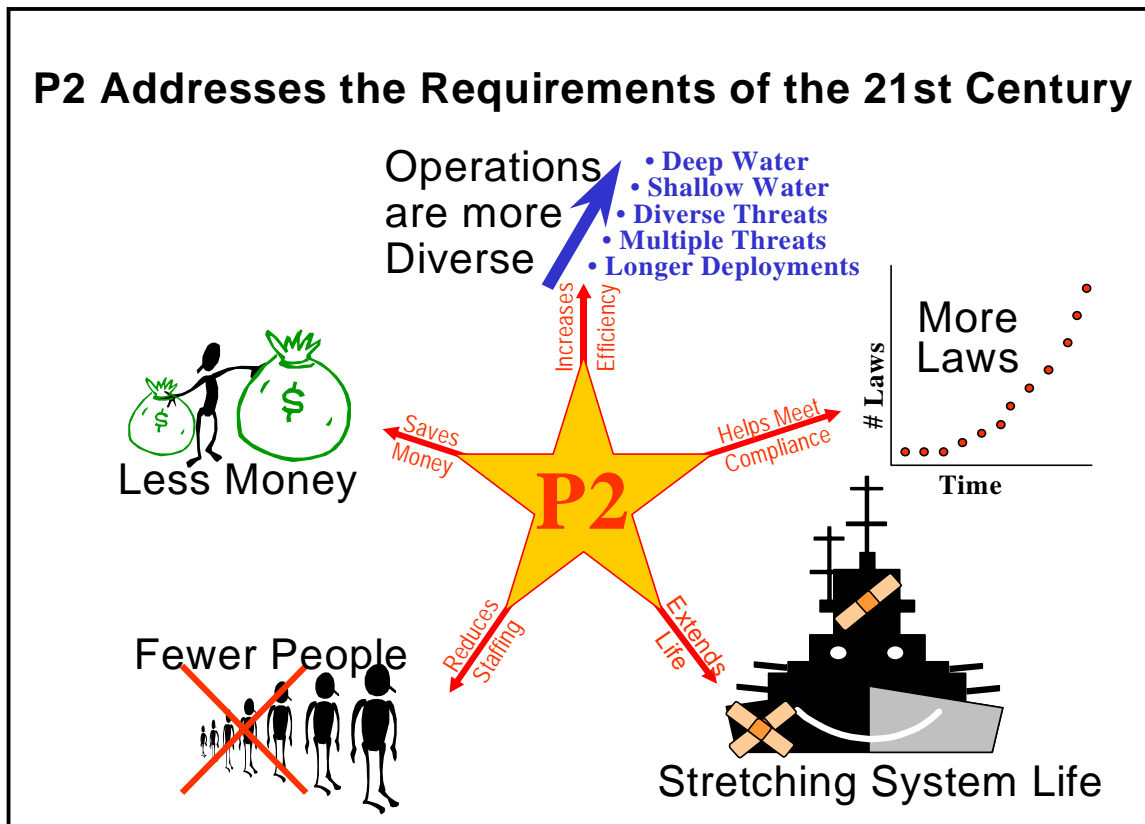
## 6.3 21<sup>st</sup> Century Environmental Challenges

As evidenced by the number of environmental laws passed since the 1970s, there is a growing awareness of the human health and environmental costs associated with normal industrial operations. Increasingly, the American public demands both a safer and cleaner environment.

### 6.3.1 The Road Ahead

The Navy has done an admirable job protecting the American public from both strategic and environmental threats. However, in the 21<sup>st</sup> century, the demands on the Navy will be even greater: Environmental demands will likely increase even as the Navy's strategic threats continue to diversify and require more flexibility. On top of all this, the Navy must continue to respond to the challenges posed by reduced budgets and a smaller workforce.

Figure 16. Navy's 21<sup>st</sup> Century Environmental Challenges



There is a tool to rely on, however,



**P2!!**

For example, P2 can:

- ♦ Save money!
- ♦ Enhance mission capability and combat readiness!
- ♦ Reduce liability!
- ♦ Proactively protect the environment!

*The challenges of the 21<sup>st</sup> century can be met head-on by implementing P2!*

## **APPENDIX A: Key Term Definitions**

<b>TERM</b>	<b>DEFINITION</b>
<i><b>Life-cycle Perspective</b></i>	The philosophy of examining a product or process throughout its entire existence instead of viewing it through the “snapshot” perspective often considers only current or near-term impacts. A complete life-cycle perspective stretches from cradle to grave and also considers the impact of the raw materials with which the product was made. This perspective also considers ways to improve the production process.
<i><b>Life-Cycle</b></i>	The cradle-to-grave existence of a product or process.
<i><b>Hazardous Materials</b></i>	Any material deemed hazardous to people or the environment due to its known effects or characteristics.
<i><b>End-of-Pipe</b></i>	The tendency to view waste as a problem only after it has been released from a process. This is contrasted with the P2 perspective, which advocates the life-cycle philosophy and source reduction practices that emphasize the reduction or complete avoidance of waste generation.
<i><b>Source Reduction</b></i>	The most desirable way to deal with pollution and waste! This practice focuses on the reduction of waste-causing products at the onset of a production process. This can be accomplished many ways, including process modification, material substitution, procedural change, or even improved housekeeping. Source reduction does not include recycling or treatment.
<i><b>Reuse</b></i>	An alternative way to deal with waste that entails using product or material more than once in a process in order to extend its lifetime and avoid or reduce waste generation.
<i><b>Recycle</b></i>	An alternative way to deal with waste that entails an altering process that makes some portion of it useable again. (Usually done outside of the original process that generated the waste.)
<i><b>Treatment</b></i>	An alternative way to deal with waste that entails reducing its volume or decreasing its toxicity.
<i><b>Disposal</b></i>	When no option for waste treatment exists, then it can be burned, buried, or stored.
<i><b>Smart Business</b></i>	The philosophy of considering all costs and risks when developing a project concept. This ensures contingencies are pre-planned, and helps to eliminate, or at least reduce, unnecessary costs and risks.
<i><b>Lessons Learned</b></i>	The knowledge gained from examining past experiences (both good and bad).
<i><b>NAVSEA P2 Working Group</b></i>	A NAVSEA guidance group chartered to examine P2 strategy, analyze problems, and advocate P2 solutions, across the entire NAVSEA community.
<i><b>Root Cause(s)</b></i>	The fundamental answer found when examining why a problem appeared. Finding the root cause may require several steps – for example, a spill caused by an operator could initially be deemed to be the operator’s error, but further examination determines that the operator lacked adequate training.
<i><b>P2 Assessment</b></i>	The procedure of gathering data on P2 opportunities and examining the risk and cost of implementing/operating the alternatives as compared to the original process. Results are usually expressed in payback time (how long it takes for cost savings to pay for implementing the alternative).
<i><b>P2 Opportunity</b></i>	Review of a process to find less polluting or resource-conserving alternatives. This focuses on source reduction (first tier of the P2 hierarchy), but also examines reuse, recycling, and treatment. (See P2 Assessment)
<i><b>Cost Effective</b></i>	A process change that appears worthwhile after examining benefit and cost.



## **FEEDBACK ON THE NAVSEA P2 DESKTOP GUIDE**

This guide will improve with your help. Please take the time to give us feedback via one of the following methods.

**EMAIL:** Email your comments to the P2 Working Group Sub-Committee care of:  
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### **SUGGESTIONS FOR IMPROVEMENT?** (Please Reference Page or Paragraph Number)

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### **MAY WE CONTACT YOU FOR MORE INFORMATION?**

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